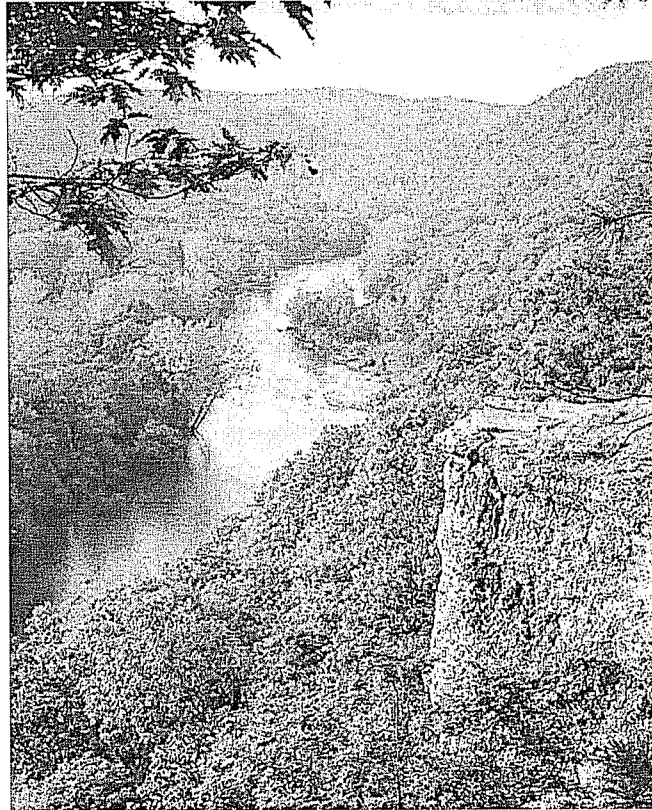




## **Coordinated Watershed Restoration and Protection Strategy for Oklahoma's Impaired Scenic Rivers**

*(per 82 O.S. 51457 as amended by Senate Bill 972 in 2002)*

### **• 2007 Update •**



Coordinated and Prepared By:

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**EXHIBIT**

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## Introduction

During its 2002 Session, the Legislature passed Senate Bill 972, which charged the Secretary of the Environment with coordinating with the other state environmental agencies to develop a "watershed restoration and protection strategy for each impaired scenic river in this state" ("Strategy"). In particular, the Strategy was to list "all permitted or registered water pollution sources," and to describe the efforts of state environmental agencies to identify and mitigate pollutants causing impairment of these most treasured watersheds.

This information is required in subsequent annual reports in order to check the progress of actions initiated by the state environmental agencies in their efforts to restore and protect Oklahoma's Scenic Rivers. These annual reports ("Updates") are to be coordinated and compiled by the Secretary of the Environment and submitted to the Governor, the President Pro Tempore of the Senate, and the Speaker of the House of Representatives. This report constitutes the 2007 Update.

## The Scenic Rivers

The Oklahoma Legislature resolved to protect a handful of treasured streams when in 1970, it passed the "Scenic Rivers Act" (*82 O.S. 1451-1471*) as a means to identify and preserve the unique characteristics and uses of the state's most scenic streams. This same legislation identified four streams to be designated as "Scenic River Areas": Flint Creek, Illinois River, Barren Fork Creek, and Upper Mountain Fork River. In 1975, the Legislature added Lee Creek and Little Lee Creek. The primary purpose of the Scenic Rivers Act, and the subsequent water quality standards regulations promulgated pursuant thereto, is to preserve the high quality and unique characteristics of these outstanding resource waters.

Recent water quality data collected by the Oklahoma Water Resources Board ("OWRB") at its Beneficial Use Monitoring Program ("BUMP") permanent monitoring stations indicate that water quality is presently impaired in Flint Creek, Barren Fork Creek, and the Illinois River (all within the Illinois River watershed), as well as in Lee Creek and the Upper Mountain Fork River. The most recent data and information are included in the recently released 2006 BUMP Final Report, and these impairments are reflected in the State's 2004 Integrated Water Quality Report/303(d) list.

## Restoration/Protection

Since the 1970 enactment of the Scenic Rivers Act, the Oklahoma Legislature has placed special emphasis on the protection of the state's Scenic Rivers. Through a combination of cooperative initiatives, coupled with administrative and legal actions, great strides have been made in the effort to stem degradation of these treasured resources.

Over the past decade, the State has heightened efforts to restore and protect its Scenic Rivers, notably through the development of a numeric phosphorus criterion in Oklahoma's Water Quality Standards ("OWQS"). The high level of cooperation and support of all state environmental agencies, coupled with the solid technical justification derived from extensive research, paved the way for State and U.S. Environmental Protection Agency ("EPA") adoption of a 0.037 mg/L phosphorus criterion to protect the state's nutrient-imperiled Scenic Rivers. With the numerical phosphorus criterion, the state now has an invaluable regulatory tool for addressing nutrient loading to its Scenic Rivers.

For its part, the State of Arkansas expressed its concerns regarding the proposed criterion and vehemently opposed its passage due to the regulatory implications on its municipalities and industries as a result of a previous Supreme Court decision that held that downstream states' water quality standards could be imposed upon upstream states. Shortly after Governor Keating's approval of the new OWQS in May of 2002, State officials from Oklahoma and Arkansas met in an effort to reach agreement on necessary phosphorus reductions in both states while, at the same time, avoiding what could be costly and protracted litigation.

Over the course of the negotiations, the major municipalities in Arkansas vowed to upgrade their treatment facilities in order to meet the same 1 mg/L effluent limit for phosphorus that is required of Oklahoma's municipal dischargers in the Scenic River watersheds. Further, the



Arkansas General Assembly passed legislation in 2003 establishing a poultry regulatory program somewhat like the one enacted by Oklahoma's Legislature in 1998. In addition to regulation of poultry waste, this Arkansas legislation seeks to regulate the land application of other nutrient sources in vulnerable watersheds, including commercial fertilizer.

Albeit more encompassing in that it also regulates commercial fertilizer application, the Arkansas legislation contains several provisions that allow for unregulated litter application under certain circumstances. For example, the land application standards can be deferred if "there is no alternative use for litter or there are no readily available, affordable alternative nutrient supplies for which litter has been used" (Arkansas Code Title 15 § 20-1111(c)(2)). What is more, poultry operators must be "adequately compensated" for the value of their litter in order for a use other than land application to be considered an "alternative use" under the Arkansas statute (Arkansas Code Title 15 § 20-1110(c)(2)). After approximately 18 months of delay, Arkansas promulgated permanent rules to implement its new nutrient management statutes in the fall of 2005. However, the prohibition against land application of poultry litter except according to the requirements of an animal waste management plan was deferred until January 2007.

As described in previous Updates, both Oklahoma and Arkansas came together to sign a Statement of Joint Principles and Actions ("Statement") on December 18, 2003, which laid the groundwork for future collaboration and cooperation in reducing phosphorus loading in the Scenic River watersheds. At the time, Oklahoma anticipated a 75% reduction in existing point source phosphorus loading to the Scenic Rivers upon full implementation of the point source reductions embodied in the Statement. As noted in previous Updates, data seem to indicate progress in this regard already.

Because the majority of the phosphorus and bacterial pollution, stems from nonpoint sources, efforts to restore the Scenic Rivers are obstructed by the lack of a similar commitment on the part of the poultry integrator companies that operate in Scenic River watersheds. The single largest contributor of nonpoint source phosphorus pollution is surplus poultry litter generated by the integrators' flocks. Thus, it is imperative that the poultry integrator companies take responsibility for the safe disposal of surplus litter at their corporate-owned and contract facilities in both states in order to remove one of the most significant sources of pollution in Oklahoma's Scenic Rivers. This is one of the specifically identified purposes of the State's current litigation.

Since Federal approval of the State's numeric phosphorus criterion, Oklahoma is in a much stronger position to utilize the Clean Water Act process and seek significant Scenic River protections, including the drafting of watershed plans and, as needed, total maximum daily loads ("TMDL") for each pollutant causing impairment. Either process can result in the calculation of an "overall pollutant-specific load reduction" called for in *82 O.S. 2002, section 1457(B)(2)(a)*, which can serve as the target "to bring each impaired scenic river back into compliance with water quality standards." However, neither of these processes will be effective without the cooperation of the State of Arkansas and the participation of those entities on both sides of the border, such as the poultry integrator companies and municipal dischargers, which contribute pollutants. Unfortunately, the inability of the states to agree on core issues, such as a common approach for managing poultry waste, prevents such a joint effort.

A critical component of Oklahoma's efforts to protect and restore the water quality in its Scenic Rivers is the lawsuit it has brought against poultry integrators operating in the Illinois River Basin. The suit seeks to force the integrators to take responsibility for the proper management of poultry waste on both sides of the border and to work to undo the impact of pollution by nutrients, bacteria, and other contaminants. The successful resolution of Oklahoma's lawsuit against the integrators will hopefully establish a more unified and effective approach throughout the watershed.

### **Municipal/Industrial Sector**

Both the Arkansas Department of Environmental Quality ("ADEQ") and the ODEQ will enforce the discharge permits issued pursuant to the Statement of Joint Principles and Actions. Over the course of 2006, the ODEQ conducted multiple inspections of wastewater treatment plants within Scenic River watersheds in an effort to ensure compliance with permit requirements. Other efforts of the ODEQ to restore and protect Scenic Rivers include the following:

- Tahlequah - Permit issued on June 13, 2005 with a limit for Phosphorus of 1 mg/l.
- Westville - Permit issued on July 1, 2005 with a reduced limit for Phosphorus of 1 mg/l. Construction of Westville's new wastewater treatment plant was completed in September 2007.
- ODEQ has completed the Final Report to evaluate metals and pesticides on stream segments within the Illinois River watershed that had been suspected of impairment. The Report concluded that these segments should not be listed as impaired by metals or pesticides.
  - A significant effort has been made by DEQ to provide comments and information to adjacent states concerning those wastewater activities that may have some impact on state waters, particularly Oklahoma's Scenic Rivers. By providing comments on proposed permits, or simply providing supporting information to decision makers, DEQ works with adjacent states to protect our waters.
- When considering 401 Water Quality Certification for the Corps of Engineers (Corps) nationwide permits (404 dredge and fill operations) within Scenic River watersheds, DEQ continues to evaluate unique conditions to determine if additional justification is required or if certification denial is warranted.
- As a result of a joint effort between the Corps and DEQ, the Corps has designated all Scenic Rivers as Critical Resource Waters.
- As a result of a joint effort between the Corps and DEQ, a regional general permit for common Corps projects involving Critical Resource Waters has been developed. This permit includes additional protections for Critical Resource Waters.

- Targeted training has been provided to local DEQ staff on addressing issues that are unique to Scenic River watersheds. This proactive step allows for a prompt and appropriate DEQ response to situations that arise.
- DEQ is working in concert with Oklahoma State University to educate on-site wastewater system installers regarding the importance of soil in the renovation of wastewater treatment systems. While this is a statewide effort, it is certainly applicable to areas within Scenic River basins and provides direct environmental benefit.
- As a recommendation for the future, DEQ is looking into the feasibility of requiring all on-site wastewater systems within a Scenic River watershed to be designed using soil profile descriptions instead of percolation tests.
- DEQ continues to investigate complaints and to pursue enforcement, where warranted, within Scenic River watersheds. A few examples of such actions are as follows:
  - Investigated a complaint on gravel removal in Sager Creek on April 22, 2005. Enforcement action followed.
  - Investigated a complaint on a resort on the Illinois River for gravel removal and unpermitted activity on May 9, 2005. Enforcement action followed resulting in the owner completing the terms of an enforcement order in June 2006.
  - Investigated the construction of an unpermitted dam on the Baron Fork of the Illinois River in Cherokee County by a private recreational club on August 8, 2005. Enforcement action followed by EPA.
  - Investigated a site where clearing and bank stabilization had occurred on Flint Creek on August 22, 2005. Follow up meetings have been held with the owner to develop an appropriate supplemental environmental project ("SEP"). Resolution is pending.
  - Investigated a complaint at a resort on the Illinois River for a gravel removal and unpermitted activity on July 2, 2004. Enforcement action followed and was completed in August, 2006.
  - Provided technical assistance to a private site on Flint Creek in September, 2006, along with the United States Army Corps of Engineers, Tulsa District. No permits were required for the proposed activities.
  - Provided technical assistance to a youth ranch facility on Flint Creek in December, 2006. No permits were required for the activity as proposed.

## **Agricultural Sector**

The Oklahoma Department of Agriculture, Food, & Forestry ("ODAFF") has the authority to ensure compliance with the revised nutrient management plans at registered poultry feeding operations in Oklahoma.

Except for two nurseries, none of the agricultural related activities under ODAFF's jurisdiction have permits to discharge to Scenic Rivers. However, land application of poultry waste or other agricultural waste above the agronomic rates or applying on land already saturated with nutrients yields polluted runoff contributing to the degradation of water quality in the Scenic Rivers. In addition to nutrients, land application of poultry waste introduces bacteria and other pollutants into Scenic River watersheds. The irrigation tail-water return flow from plant nurseries in the Illinois River watershed could also contribute to the degradation of the water quality of the Scenic Rivers.

Tasks performed by ODAFF in an effort to restore and protect Scenic River watersheds included:

- For Poultry Operations:
  - Assisted growers in developing Animal Waste/Nutrient Management Plans. Currently more than 80% of poultry operations have submitted copies of these plans to ODAFF. Two ODAFF contract soil scientists have written 502 Animal Waste Management Plans for poultry operations.
  - Conducted inspections of all poultry operations located in the watersheds.
    - 704 inspections were performed by ODAFF poultry inspectors from January 1, 2006 to December 31, 2006.
  - Provided technical assistance to poultry operators on 2,011 occasions in fiscal year 2006.
  - From July 1, 2005 to December 31, 2006, ODAFF performed 64 enforcement actions against violators of poultry statutes and rules located in the watersheds, and issued fines totaling \$2,000.
  - Coordinated with other agencies in developing Comprehensive Nutrient Management Plans ("CNMP") for facilities located in the impaired watersheds. Agricultural Environmental Management Services ("AEMS") Division of ODAFF signed a cooperative agreement with Natural Resources Conservative Service ("NRCS") of USDA to develop CNMPs for those operations applying for Environmental Quality Incentives Program ("EQIP") funds to install conservation measures at their facilities. Under this agreement, CNMPs have been and are being developed by AEMS staff.
  - Continued to pursue cost-effective alternative methods of disposal of excess litter through ODAFF Market Development Division and the Office of the Secretary of the Environment.
  - Continued to assist growers in developing Animal Waste Management Plans (AWMP) and/or Nutrient Management Plans (NMP).

- Accelerated inspection and enforcement actions against violators of the Registered Poultry Feeding Operations Act and implementing rules, as well as those who do not comply with requirements of Animal Waste/Nutrient Management Plans.
- ODAFF/AEMS is currently evaluating the following research and development projects:
  - Comparison of water quality impacts from urban and agriculture-based rural nutrient sources.
  - Assessment of technical, economical, and environmental impacts of using poultry waste as a direct-burn and blended-source of energy in coal-fired plants in Oklahoma.
  - Feasibility study of using poultry waste for the reclamation of current and abandoned coal mines in Oklahoma.
  - Evaluation of the impact of land application of poultry waste on waterbodies located in the vicinity of the application site.
- For Nursery Operations:
  - Nursery operations were monitored monthly for nitrate-nitrogen, total-phosphorous and pesticides from 1989 to 2001. Results have been published in *The Curtis Report 1989–1992*, 1993, 1994, 1995, 1996, 1997
  - Signed voluntary compliance agreements with nursery operations to reduce nutrient loading.
  - Notified nurseries when they were out of compliance.

Based upon its inspection and oversight activities, ODAFF evaluated and assessed the impact of its regulated activities in the Scenic River watersheds:

- Poultry Farms
  - There are 92 poultry operations (more than half raising broilers) registered with ODAFF, consisting of 74 operations in the Upper Illinois River ("UIR") watershed encompassing parts of Adair County, Cherokee County and Delaware County; 2 operations in the Lee Creek/Little Lee Creek ("LLC") watershed encompassing parts of Adair, Leflore and Sequoyah Counties; and 16 operations in the Upper Mountain Fork ("UMF") watershed encompassing part of McCurtain County. Registration information suggests that these operations manage a total of 423 houses with 393 houses and 7,644,430 birds in UIR watershed, 6 houses and 112,000 birds in LLC watershed, and 24 houses and 304,000 birds in UMF watershed.
  - The total number of registered operations decreased from 111 in 2005 to 92 this year, a 17% reduction; while the total number of houses registered decreased from 462 to 423 houses, a reduction of only 8%; and the total number of registered bird spaces decreased at an even lesser rate, from 8,443,530 to 8,060,430 spaces this year, a reduction of only 4.5 %.



- The trend of the industry is operating fewer houses at each facility and the houses become larger with more bird spaces than before. Compared to last year (2005), the number of bird spaces decreased approximately 4.5% in UIR watershed, and 2% in LLC watershed; while it slightly increased, less than 1%, in UMF watershed.
- The majority of the poultry operations in the watersheds raise broilers, consequently ODAFF has estimated the total amounts of litter and nutrients produced for all operations based on the broiler production rate of 18 lbs of litter per year per space and its nutrient values of 46 lbs of total nitrogen and 53 lbs of  $P_2O_5$  per ton of litter.<sup>(1)</sup> The estimated amount of litter and nutrients generated per year in the Oklahoma portion of the different watersheds is listed in Table 1.

**Table 1.** Estimated annual amount of litter and nutrients generated in the Scenic River watersheds in Oklahoma.<sup>(1)</sup>

Watershed	Litter (ton)	Total N (ton)	$P_2O_5$ (ton)	Phosphorus P (ton)
UIR	68,800	1,582	1,823	796
LLC	1,008	23	27	12
UMF	2,736	63	72	31
<b>Total</b>	<b>72,544</b>	<b>1,668</b>	<b>1,922</b>	<b>839</b>

<sup>(1)</sup>Table 11: Estimated Solid Manure Characteristics, Manure Characteristics, Manure Management System Series, Midwest Plan Service (MWPS)-18, Section 1.

- Compared to 2005, ODAFF estimates a slight decrease (about 4.5 %) in litter produced, from 75,992 tons to 72,544 tons, resulting in a small decrease in  $P_2O_5$  generated: from 2,014 tons in 2005 to 1,922 tons in 2006.
- The above estimation is based on the actual bird space rather than the traditional method of estimating based on a litter production rate of 125 tons per year per house. Since the houses are larger, the number of chicken spaces per house increase as well as the amount of litter generated.

ODAFF inspectors collected soil samples for soil test phosphorus ("STP") at poultry operations located in several counties in the Scenic River watersheds in Summer and Fall of 2002. The results indicated that more than 39% of samples collected exceeded the STP of 250. Samples collected by ODAFF inspectors also indicated that more than 77% of the samples exceeded the STP of 120, and more than 33% of the samples exceeded the STP of 300.

- Since the above samples do not cover all lands located in the watersheds that are either being used as land application sites or that may be available for future land application sites, the extra phosphorus loading, above and beyond the soil capacity for agronomic use, could not be accurately estimated using this data. On the other hand, the limited data on STPs for lands currently being used for litter application in the watersheds, which have been submitted to ODAFF by Poultry Litter Applicators in their annual reports for the year 2005, showed a different picture with approximately 24.2% of

samples exceeding STP 120, 4.7% of the samples exceeding the STP of 250, and 2.5% of samples exceeding STP 300. These undoubtedly appear to be more positive than sampling done by ODAFF inspectors. Compared to the previous year (2004) reports, the STP excess rates for 2005 were slightly lower.

- Based on the results of soil tests collected by ODAFF inspectors, using a threshold of STP of 250 it is assumed that 39% of lands located in the watersheds that are being used for litter application are at capacity for P loading. Using STP thresholds of 120 and 300, and ODAFF inspector soil test results the percentage of land at capacity for P loading would be 77% and 33%, respectively. Table 2 presents the estimated amounts of extra poultry litter, based on these different STP thresholds of 120, 250 and 300, which should either be transferred out of each watershed or be applied onto other phosphorus deficient lands in the watersheds.

**Table 2.** Estimated amounts of extra poultry litter generated in Oklahoma, based upon different soil test phosphorus thresholds, that should not be applied to traditionally used land application fields.

Watershed	Excess Litter (STP 120)	Excess Litter (STP 250)	Excess Litter (STP 300)
UIR	52,976 tons	26,832 tons	22,704 tons
LLC	776 tons	393 tons	333 tons
UMF	2,107 tons	1,067 tons	903 tons
<b>Total</b>	<b>55,859 tons</b>	<b>28,292 tons</b>	<b>23,940 tons</b>

- The percentage of lands at capacity for P loading and the estimated amount of excess litter listed above will need to be revised once all STP data are submitted and verified by ODAFF and/or additional STP samples are collected by ODAFF inspectors.
- Nursery Operations
  - There are two large containerized plant nurseries along the Illinois River that have had irrigation tail-water return flow enter the river. These operations were monitored monthly for nitrate-nitrogen, total-phosphorous and pesticides from 1989 to 2001. One operation became totally contained in 1998 and only has runoff leaving its property during large rainfall events. These nurseries signed voluntary compliance agreements with ODAFF to reduce the yearly average nitrate level in their discharge from a high of 27.99 mg/l NO<sub>3</sub>-N in 1989 to 10 mg/l in 1996. They also agreed to reduce the Phosphorus (total) level down to 1 mg/l.

Beyond the aforementioned regulatory efforts to reduce pollution from municipal dischargers and poultry operations, which together contribute the vast majority of the pollution to Scenic Rivers, projects designed to enlist voluntary cooperation from watershed landowners continue in the Scenic River watersheds. Such projects are designed to provide government cost-share assistance for landowners to install best management practices ("BMPs") that are designed to reduce the pollutants causing impairment. Significant Clean Water Act §319(h), USDA

Environmental Quality Incentive Program ("EQIP"), and/or State Cost-Share Program monies have been expended in both Arkansas and Oklahoma to reduce nutrient impacts on water quality, particularly in the Illinois River watershed. Oklahoma hopes to continue working with Arkansas on these essential nonpoint source pollution abatement projects in the future so that voluntary efforts to reduce Scenic River impairment are intensified.

### **Poultry Operations in Arkansas**

To better understand the sheer magnitude of agricultural pollution sources across the state line, information on poultry operations in the Arkansas portion of the Scenic River watersheds was solicited from the Arkansas Natural Resources Commission ("ANRC"). Table 3 summarizes the data provided. Despite the fact that data may be incomplete based upon operations still pending registration under Arkansas' new program, the poultry industry in the Arkansas portion of Oklahoma's Scenic River watersheds is nearly four times larger than in Oklahoma, notwithstanding the fact that the majority of watershed land area is in Oklahoma.

**Table 3.** Summary of data provided by the Arkansas Natural Resources Commission for Arkansas poultry operations within the Scenic River watersheds that registered in 2006.

<b>Watershed</b>	<b># of birds/yr</b>	<b># of houses</b>	<b>litter generated (tons)</b>
Illinois River	26,300,622	1,455	163,128
Upper Mountain Fork	2,834,700	145	17,355
Lee Creek	556,959	69	4,494
<b>Total</b>	<b>29,692,281</b>	<b>1,669</b>	<b>184,976</b>

### **Poultry Litter Transfer in the Illinois River Watershed**

In an effort to encourage movement of poultry litter out of the Illinois River Watershed into areas of the state where it would pose a lower risk to water resources, the Oklahoma Conservation Commission ("OKCC") partnered with poultry integrators to use \$300,000 in Federal 319 funds and \$200,000 of integrator money to supplement litter hauling from the Illinois River watershed. According to information provided by the contractor these funds facilitated the movement of 49,596 tons of poultry waste between May of 2005 and December 2006. The intent of the effort was to facilitate the establishment of both a network of sellers, buyers, and litter transporters that will ultimately become a self-sustaining litter market. As agricultural producers in other areas of the state become aware of the benefits of litter, and as commercial fertilizer continues to rise in cost, the demand for litter could increase to a level where transport costs are no longer a limiting factor in moving it from nutrient limited watersheds.

Poultry litter exports from the Illinois River Watershed between May 2005 and Dec. 2006:

- Oklahoma: 34,137 tons
- Arkansas: 15,459 tons

Combined Oklahoma and Arkansas: 49,456 tons

### **Establishment of Riparian Easements**

OSE and OKCC also partnered with the Scenic Rivers Commission to establish long-term riparian easements in the Illinois River Basin to reduce nonpoint source pollution in the watershed. The program will use approximately \$625,000 of federal, state, and local funds to install long-term

riparian easements in the watershed. In addition to long-term protection of these critical areas, project results can also be used to tailor future conservation efforts in the watershed.

### **Conservation Reserve Enhancement Program**

USDA Farm Services Agency ("FSA") and Natural Resources Conservation Service ("NRCS") partnered with the OKCC to propose a Conservation Reserve Enhancement Program ("CREP") to install additional riparian buffers in the Illinois River and Lake Spavinaw watersheds. The OKCC pursued the required State match to acquire the federal funds through the past legislative session. While no state funds were made available by the legislature, funds necessary to leverage a scaled back CREP program for the Illinois River/Lake Tenkiller and Spavinaw Lake watersheds were secured from other sources.

This CREP program will build upon lessons learned from the State 319 program, FSA, and NRCS efforts in these watersheds to insure adoption of best management practices by landowners and, for the Illinois River/Lake Tenkiller portion, utilize approximately \$9 million of state, federal, and local funds to install over 4,000 acres (110 miles of streambank) of protected riparian area. The program will protect these areas for at least fifteen years, although many will remain protected for longer. Given the success of riparian buffers elsewhere, these programs should have a significant impact on water quality in these watersheds.

### **Recreational Sector**

As the only State agency created with the specific charge of protecting the Illinois River and its tributaries, the Oklahoma Scenic Rivers Commission ("OSRC") has been extremely active in all watershed efforts, particularly in policing the rivers and educating users about the value of Scenic Rivers. Over the course of 2006, OSRC reports the following milestones and successes:

- OSRC continued operation of 24 portable toilets in areas adjacent to the Barren Fork Creek, Flint Creek and Illinois River from May through September. A total of 30,720 gallons of wastewater were collected and appropriately disposed of during the service period.
- Additionally, OSRC pumped and properly disposed of 14,400 gallons of wastewater from 12 permanent toilet facilities in public access areas located in the same area.
- Approximately 400,000 individuals visited the Scenic River areas located within the OSRC operating area. Illinois River floating activity resulted in \$114,985 in user fees paid by Commercial Flotation Device Operators, along with another \$4,131 generated from private boaters.
- OSRC reached some 3,500 students through education outreach at Illinois River Basin public schools. Additionally, the OSRC presented programs to many Rotary, Lions, Kiwanis and other civic organizations located in Oklahoma and Arkansas communities, along with weekly Summer Campground Programs at Round Hollow Public Access Area on Saturday evenings (Memorial Day Holiday-Labor Day Holiday).
- As one of OSRC's major concerns, staff policed the scenic river areas for trash/litter everyday except Christmas. In 2006, 45,000 trash bags were distributed to commercial flotation device operations for "free" distribution to floaters. OSRC staff



picked up approximately 90,000 pounds of trash/litter from public access areas and river.

- OSRC also conducted 3 volunteer clean up events with some 600 total volunteers participating. Those three events policed an additional 4.5 tons of trash/litter from the river.
- Additionally, the OSRC provided the following services:
  - Communicated efforts with stakeholders in publishing a quarterly newsletter and maintaining the website [www.oklahomascenicrivers.net](http://www.oklahomascenicrivers.net)
  - Published and distributed 10,000 floater guides
  - Provided environmental review for approximately 400 projects to local communities, county and sub-state planning districts, and Indian Tribes in Oklahoma
  - Partnered with ODEQ to identify, enforce and bring about remediation projects on six major environmental damage incidents causing impacts to Scenic River areas
  - OSRC Law Enforcement issued approximately 300 citations and arrested/jailed 100 people for violations ranging from littering to outraging public decency/public intoxication to assault and battery.
  - OSRC participated in cost-sharing a water quality monitoring program with the United States Geologic Survey ("USGS") to maintain ambient water quality sampling. Additionally, sampling targeted several storm water runoff events.
  - Another cooperative venture has been the OSRC's work with OSE and the Conservation Commission to secure the state's first ever CREP, which should result in approximately \$7-10 million dollars coming to bear in abating pollutant runoff and improving riparian areas located immediately adjacent to Barren Fork Creek, Flint Creek and the Illinois River.
  - Partnered with OSE and the Oklahoma Conservation Commission to implement a new riparian protection lease project with stakeholders to set aside approximately 275 acres of riparian buffer zones for lease terms of up to 30-years.

## **Mining Sector**

The Oklahoma Department of Mines ("ODM") has specific regulations governing gravel mining operations on Oklahoma's Scenic Rivers (at OAC 460:10-13-3 and 10-13-4). These guidelines establish more stringent operational requirements for permitting and operation on Scenic Rivers as defined by Oklahoma Statute, as well as other High Quality Waters and Outstanding Resource Waters identified in Oklahoma's Water Quality Standards. A total of four operations are currently permitted by ODM under these more stringent guidelines.

Some of the operational requirements implemented by ODM as detailed in OAC 460:10-13-4 include:

- a. Reference to other state required permits pertaining to the site.
- b. Comply with all state water quality environmental laws when removing or stockpiling gravel.
- c. Mining in or driving into the wetted portion of the riverbed is prohibited.
- d. Changing the course of the river is prohibited.
- e. Maintain a 100-foot buffer of natural vegetation between the river's edge and any processing plant site other than normal access to the stream. If no plant is located on the property, the operator shall take precautions to preserve stream bank integrity.
- f. Where appropriate, BMPs such as sediment traps and fences shall be installed and maintained to minimize sediment and spoil return to a stream.

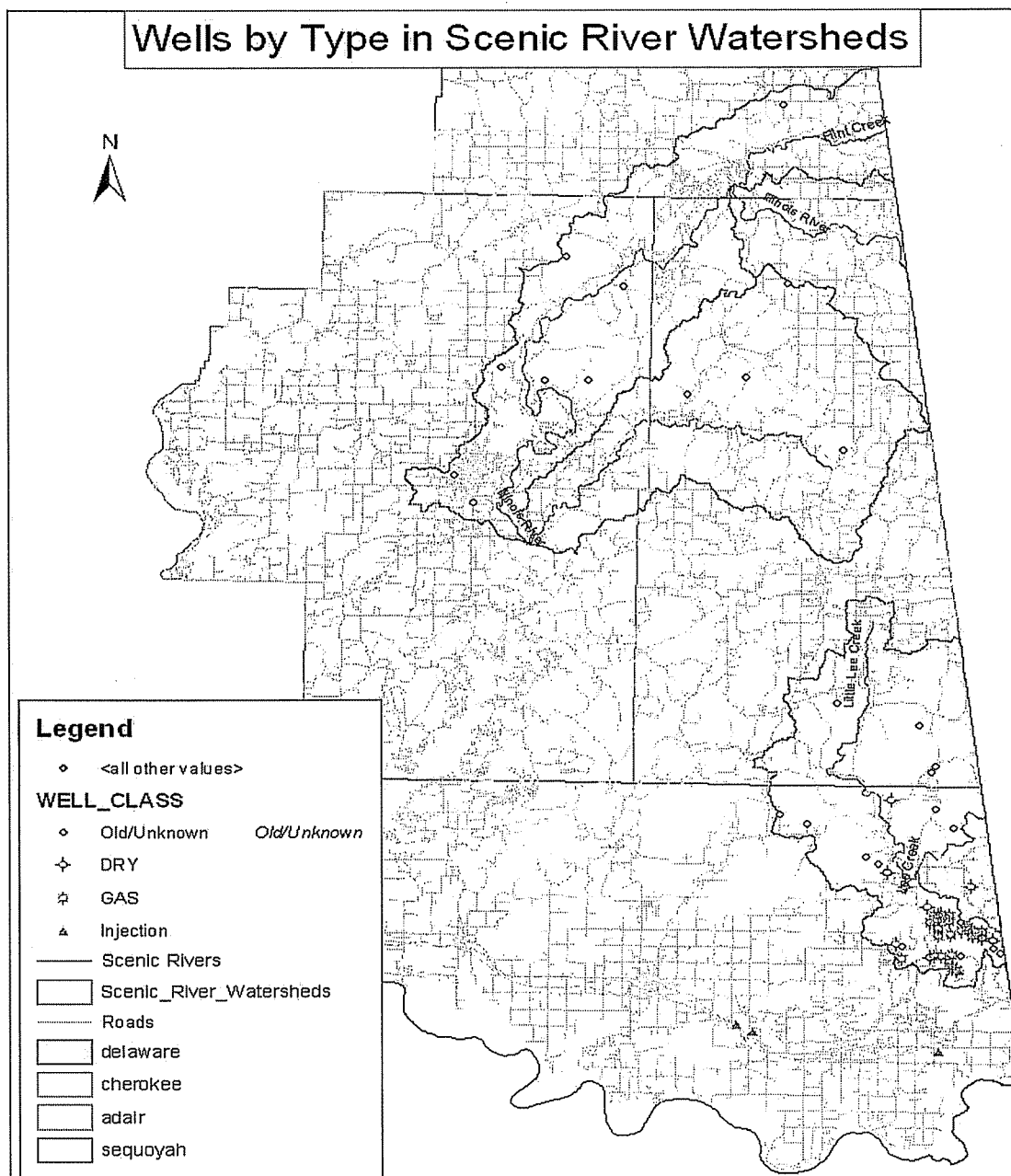
Prior to ODM permit issuance, the applicant also must submit approved copies of other state, federal, and local government permits or licenses, (460:10-13-4). These permits include but are not limited to:

- Stormwater permit
- Pollution prevention plan
- NPDES and/or OPDES
- Floodplain permit
- Stream water permit
- Copies of notifications sent to state and federal fish and wildlife agencies
- Army Corps of Engineers notification
- Closure plan

Finally, a stream water monitoring plan is required to be submitted and implemented prior to, and during, mining operations. This rule allows for the use of any plan filed with other agencies with jurisdiction.

**Oil & Gas** – Historically, oil and gas activity in the Illinois River watershed has been extremely limited, and there has been no activity in these watersheds during the past five years (Figure 1). Furthermore, there has been no recent or historic oil and gas activity near the Mountain Fork River. In April 2005, Oklahoma Corporation Commission staff physically inspected the Illinois River watershed, including the Flint Creek and Barren Fork tributaries. They found no new oil and gas drilling or inspection activity.

The only recent oil and gas activity in a Scenic River Watershed is near Lee Creek. Of the 40 wells in Sequoyah County with new activity initiated from 2000 to present (including 3 new wells or re-completions in progress in 2005), seven (six new gas well completions and one well in progress) are in the Lee Creek watershed. These wells ranged from ¼ mile to 4 miles from Lee Creek.



**Figure 1.** Oil and gas wells by type in Scenic River watersheds.

The limited extent of oil and gas activity in these watersheds comports with the few complaints in the Oklahoma Corporation Commission database for Adair, Cherokee, and Delaware counties, which all deal with Petroleum Storage Tank ("PST") related problems. Only in Sequoyah County, near Lee Creek, have there been oil and gas activity related complaints. There were two complaints (one in 2000 and one in 2004), both for wells in the gas producing area at the south end of the watershed. Both complaints were investigated and resolved.

## Monitoring

Closing the loop on water quality management involves intensive water quality monitoring, which will be critical to providing answers regarding the success of measures taken to reverse the impairment of Oklahoma's Scenic Rivers. Monitoring is vital to establishing water quality trends in the Scenic Rivers and to determining whether or not other impairments exist, particularly in the Lee and Little Lee Creek watersheds where more data are needed. This same long-term monitoring will ascertain the degree to which existing water quality standards adequately protect the beneficial uses and antidegradation provisions assigned to the Scenic Rivers. Any shortcomings in regulatory or voluntary tools employed to reverse impairment will be identified through water quality monitoring, and modifications to those tools, including possible water quality standards revisions and TMDL modifications, will result.

Under its Beneficial Use Monitoring Program, OWRB staff maintains several stations within the Illinois River, Lee Creek, and Upper Mountain Fork River watersheds (Table 4). All but two of the stations have been monitored since the program's inception in November 1998. Caney Creek near Barber was added in 1999 because of its potentially significant influence on Tenkiller Lake. Lee Creek was added in 2002 so that all of Oklahoma's Scenic Rivers could be adequately monitored over the long-term. Although not included in Table 3, the Cherokee Nation Office of Environmental Services ("CNOES") is also monitoring Little Lee Creek at several locations. Through cooperative agreements with the OWRB OSRC, the USGS maintains stream flow gauges in each watershed and conducts targeted water quality studies throughout the Illinois River watershed.

**Table 4.** BUMP monitoring stations located in the Illinois River, Lee Creek, and Upper Mountain Fork River watersheds.

STATION I.D.	STATION NAME	COUNTY	PERIOD OF RECORD
AT197000	Barren Fork, SH 51, Eldon	Cherokee	11/98-present
AT197360	Caney Creek, off SH 100, Barber	Cherokee	9/99-present
AT196000	Flint Creek, US 412, Flint	Delaware	11/98-present
AT195500	Illinois River, US 59, Watts	Adair	11/98-present
AT196500	Illinois River, US 62, Tahlequah	Cherokee	11/98-present
AT249800	Lee Creek, SH 101, Short	Sequoyah	1/03-present
AT338750	Mountain Fork, SH 4, Smithville	McCurtain	11/98-present
AT195865	Sager Creek, off US 412, West Siloam Springs	Delaware	11/98-present

Recent water quality data collected by the OWRB at its Beneficial Use Monitoring Program permanent monitoring stations indicate that water quality is presently impaired in Flint Creek, Barren Fork Creek, and the Illinois River (all within the Illinois River watershed), as well as in Lee Creek and the Upper Mountain Fork River. The most recent data and information are included in the recently released 2006 BUMP Final Report, and these impairments are reflected in the State's 2004 Integrated Water Quality Report/303(d) list.



Continued monitoring and evaluation of Lake Tenkiller is equally important in understanding the affects of watershed activities on water quality in the watershed, as well as in evaluating whether pollution control efforts are achieving positive results. The OWRB's report titled "Monitoring of Tenkiller Ferry Lake Near Horseshoe Bend and Caney Creek to Support Lake Tenkiller TMDL and BMP Activities" clearly demonstrated that from 1998 through 2000, the total phosphorus load at Horseshoe Bend of Lake Tenkiller not only failed to meet the interim goal of 40% reduction but was actually 124% of the established 1996 baseline load. The recently published Arkansas-Oklahoma Arkansas River Compact Commission 2006 Report shows the total phosphorus load to be even higher at 179% of the 1996 baseline load.

Sampling of Lake Tenkiller Ferry by the Corps of Engineers showed that a new and potentially toxin-producing algae is present in the lake. Test results by the COE, OWRB, and OU Health Sciences Center show that the blue-green algae *Cylindrospermopsis raciborskii* has colonized Lake Tenkiller. Algae of the genus, *Cylindrospermopsis* have been known to produce the potent cytotoxin, cylindrospermopsin. Because of this potential, Lake Tenkiller was included in the OWRB's Harmful Algae Bloom ("HAB") project. Here, BUMP lake sampling was leveraged to allow a grab sample of algae community to be enumerated and compared against World Health Organization criteria of risk due to recreational exposure. HAB algae samples were taken in August 2004, March 2005, and May 2005 from five lacustrine zone sites in the lake. The overall recreational risk in Lake Tenkiller due to HAB toxins was found to be moderate. Algae of the genus *Cylindrospermopsis* and *Aphanocapsa* presented the greatest risk for cyanotoxin production in Lake Tenkiller. *Aphanocapsa* is known to produce microcystin, a hepatotoxin. Interestingly, the haptophyte, *Chrysochromulina parva*, was noted in the March 2005 samples. This mixotrophic algae is in the same family and may fill the same ecological niche as its cousin, *Prymnesium parvum*, or "golden algae".

Tenkiller Ferry Lake was sampled for four quarters by the Oklahoma Water Resources Board, from October 2005 through July 2006. OWRB summarized its findings as follows:

Tenkiller Ferry Lake was classified as eutrophic, indicative of high primary productivity and nutrient levels (Plate 113). Water clarity was excellent during the study period and may be attributed to the absence of inorganic turbidity (Plate 113) levels that are commonly seen in most Oklahoma reservoirs. A trophic state index (TSI), using Carlson's TSI (chlorophylla), was calculated using values collected at all sites for four quarters (n=28). The average TSI was 55 classifying the lake as eutrophic, indicative of high levels of primary productivity and nutrients. This value is similar to the TSI calculated in both 2004 and 2002 (TSI=56), indicating no significant change in productivity. TSI values varied by site and season with lower values generally occurring in the lower end of the lake near the dam. At the upper end of the lake TSI values were generally mid to upper-eutrophic throughout the year. All turbidity values were well below the Oklahoma Water Quality Standard (WQS) of 25 NTU (see Figure 130a), therefore meeting the FWP beneficial use as it relates to turbidity. Seasonal true color values are displayed in Figure 130b. All of the true color values were well below the numeric criteria of 70 units and the Aesthetics beneficial use is considered fully supported. Tenkiller Ferry Lake was supporting its FWP beneficial use based on nephelometric turbidity and partially supporting the beneficial use based on low D.O. concentrations in the water column. The low D.O. values observed in the summer at several sites are a cause for concern and should be studied further. Bacteriological samples were also collected to assess the Primary Body Contact Recreation (PBCR) beneficial use. Samples were

collected at five sites throughout the lake for *E.coli*, fecal coliform, and enterococci during the recreation season of May through September 2006. Although all sample results were below both the screening level and geometric mean, the minimum data requirements for each segment were not met and an assessment of the PBCR beneficial use cannot be made at this time.

In addition, the Oklahoma Water Resources Board initiated a probabilistic sampling program within the Illinois River basin in the summer of 2007. The main project goal is to establish baseline biological conditions throughout the watershed on the Illinois River in Oklahoma. Sampling involves data collection at 50 sites chosen randomly with sites encompassing all stream sizes. The sampling entails three to four collection events over two sample years (25 sites per year), and for quality assurances purposes, 5 sites (or 10%) will be revisited during each sample year.

Parametric coverage for the probabilistic program is diverse with a variety of chemical parameters collected and three biotic assemblages measured. The following table outlines the varying collection events and frequencies. General index periods will include late spring/early summer, mid/late summer, and winter. Fish will be collected sometime during the late spring to mid summer. The two BMI collections will occur in summer and winter. Habitat measurement will be assemblage specific. Results of the Illinois River Probabilistic sampling program will be compiled and reported in 2009.

**Table 5.** Sample parameters for Illinois River Basin Probabilistic Sampling Program.

Parameter	Collection Frequency
Physical and chemical field parameters	During each collection
Chemical "lab samples"	One collection
Benthic Macroinvertebrates	Two collections
Benthic and Sestonic Chlorophyll-a	Three collections
Total Phosphorus	Three collections
Fish	One collection
Flow	With each assessment.
Habitat	During each field collection (will have forms tailored to the algal and macroinvertebrate collections)
Bacteria	One collection

In order to build upon the momentum of the State's efforts to restore and protect Oklahoma's treasured Scenic Rivers, the support of the Oklahoma Legislature in providing adequate funding and resources is vital. Continued support of the BUMP program has been crucial to the coordinated efforts of the State. Continued support of the USGS monitoring and stream gauging programs is critical to the data needs inherent to this effort, as well. Additionally, routine monitoring of Lake Tenkiller should be resumed in order to determine the magnitude of impact from continued phosphorus loading on its beneficial uses. The feasibility of mitigating in-lake impacts should be revisited, as well, with an eye towards the potential of short-term relief while efforts toward a long-term solution continue.

Also critical to water quality monitoring is the development of tools to better assess water quality conditions. The Oklahoma Water Resources Board adopted a criterion of 0.037 ug/L total phosphorus to protect Oklahoma's six Scenic Rivers in March 2002. EPA Region VI approved the criterion in May 2004. This criterion has become the basis for substantial remedial efforts in the watershed. OWRB has subsequently continued efforts to protect and restore the Scenic Rivers with development of protocols and rules to determine if Scenic Rivers are impaired by phosphorus. OWRB also has adopted a criterion to provide additional protection for the drinking water use of Lake Tenkiller by adding a Nutrient Limited Watershed designation.

#### **Scenic River Assessment Protocol**

Working with state environmental agencies, EPA Region VI and the Arkansas Department of Environmental Quality, OWRB staff proposed an assessment protocol for determining if the Scenic Rivers Aesthetics Beneficial Use is supported with respect to concentrations of total phosphorus. This protocol established minimum data requirements and a decision rule to determine if routine monitoring data indicate that the 30-day geometric mean concentration of 0.037 mg/l total phosphorus is exceeded. This protocol was adopted by the OWRB and promulgated as state rule in OAC 785:46-15 following the Oklahoma Administrative Procedure Act. The rule became effective July 1, 2005.

#### **Lake Tenkiller NLW Designation**

Oklahoma's most recent Water Quality Standards revision also designates the Tenkiller watershed as a Nutrient Limited Watershed ("NLW") based upon the Clean Lake Study and current monitoring data indicating that nutrient loading is contributing to the impaired beneficial uses of the lake. This designation was adopted by the OWRB and promulgated as state rule in OAC 785:45-5-29 following the Oklahoma Administrative Procedure Act. The rule became effective July 1, 2006. This revision to the Oklahoma Water Quality Standards was approved by EPA Region 6 on November 15, 2006.

#### **Lake Tenkiller Chlorophyll-a criterion**

The newly promulgated Water Quality Standards revisions also contain a criterion for protection of the Public and Private Water Supply Beneficial Use of Sensitive Water Supplies ("SWS") and other critical sources of drinking water. This 10 ug/l criterion for chlorophyll-a would apply to Tenkiller Ferry Reservoir, Wister Lake and lakes designated as SWS in Appendix A of the Oklahoma Water Quality Standards. The criterion is intended to limit the occurrence of offensive taste and odor problems in drinking water and costs for treatment that are caused by excessive algae and blue green algae.

#### **Peacheater Creek National Monitoring Project**

In August of 2007 the Oklahoma Conservation Commission completed a Section 319 National Monitoring Program Project in the Peacheater Creek Watershed. Peacheater Creek is a tributary to the Baron Fork River in the Illinois River Watershed. The EPA National Monitoring Program is intended to demonstrate the quality and quantity of water quality monitoring necessary to document changes related to implementation of practices to reduce nonpoint source pollution. The project began in 1995 with a period of pre-implementation monitoring followed by implementation efforts, which completed late in 2001. Post-implementation monitoring activities began in early 2002 and completed in summer 2006. Best management practices (BMPs) implemented in the Peacheater Creek watershed were varied but all focused on nutrient

and pathogen loading reduction. Lessons learned during this ten-year monitoring effort have already been transferred to similar OKCC monitoring efforts such as the Beaty Creek (Lake Eucha) project where a recent review from EPA Region 6 touted the effort as "the strongest design and analytical approach...seen implemented in Region 6."

In summary, comparison between pre-implementation and post-implementation monitoring periods have revealed the following beneficial changes due to implementation of BMPs in the watershed:

- decreases in phosphorus concentrations and loading in Peacheater Creek over what was expected based on pre-implementation conditions
  - increasing phosphorus concentrations were curbed approximately 10% overall
  - increasing phosphorus loading was curbed approximately 66% overall
- decreased nitrogen concentrations and loading in Peacheater Creek over what was expected based on pre-implementation conditions
  - increasing total nitrogen concentrations were curbed approximately 40% overall
  - increasing total nitrogen loading was curbed by approximately 57% overall

While the primary focus of this project was to demonstrate a statistically defensible method of monitoring non-point source driven pollution remediation efforts, the project also showed that the BMPs employed by OKCC in this project were highly successful at reducing nutrient concentrations over what they might otherwise have been. These BMPs are now being implemented in many areas of the Illinois River Basin.

## Conclusion

For over three decades, the State of Oklahoma has worked diligently to ensure that its six Scenic Rivers receive the protection and reverence that they deserve. And yet with all of this intense scrutiny and effort, Oklahomans have continued to see water quality deteriorate in many of these once pristine systems. Indeed, the sheer magnitude of the population growth (both human and avian) in the Illinois River watershed, in particular, coupled with the fact that the majority of the pollutant loading stems from actions taken across state lines, often frustrates and masks the incremental improvements made by the efforts of Oklahoma.

With these realities and circumstances in mind, it is incumbent upon the State of Oklahoma to redouble its efforts to secure further pollutant reductions in the Scenic River watersheds, both in Oklahoma and Arkansas.